Gas Journal

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Gas Journal

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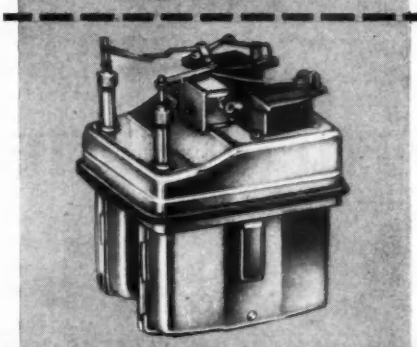

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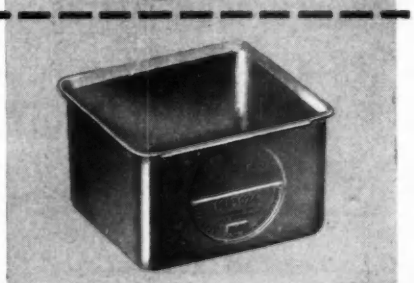

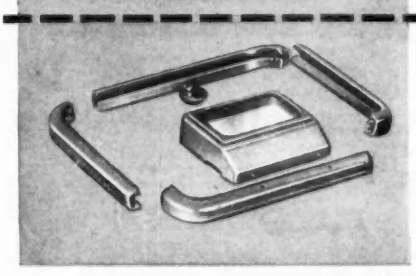

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The North Western Area Conference

IT is perhaps a sign of the times that during the North Western Gas Board's Area Conference at Southport last week the emphasis was entirely upon selling. Spurred on by an anticipated loss over the year greater than last year's £½ mill.,' the Board is facing up to the fact that it must sell much harder if it is to pull out of its difficulties. In the past there has been a tendency to include in these conferences papers on such relatively new techniques as the use of statistics, which were largely above the heads of most of the delegates, and one is tempted to suggest that the placing of greater emphasis on sales at that time might have improved the Board's position today. Be that as it may, nothing could have been more to the point than the constant insistence on selling opportunities throughout the conference this year, characterised not only by the Chairman's address but by the two papers presented.

The authors of these papers presented an interesting contrast. On the one hand Mr. Harry Butters, the Board Member who is particularly concerned with sales and service, is a striking example of a man who has the common touch, who talks to employees in their own language and who is justifiably popular for his forthright views and his cheerful personality; for him the bluff approach of an ordinary chap is in fact professionalism of a high order. Like several other leading people in the industry, he is an indifferent reader but a superb speaker off the cuff.

Beside him the guest speaker, Mr. F. Wikstrom, Director of PAR (promotion, advertising and research) to the American Gas Association, exhibited many of the same qualities but in a different setting. If Mr. Butters will forgive us for calling him an uncut diamond, Mr. Wikstrom must be labelled as very highly polished indeed. There was not a trick in the book which he did not employ to facilitate his fine control of the audience. He roused a quiet but attentive meeting to an un-British level of enthusiasm with an effortless dexterity which was as deceptive as it was professional. 'What a performance!' as the late Sid Field used to say.

Mr. Butters' paper, 'Selling Prospects,' gave an unusually comprehensive review of the Board's position, illustrating how 16% spare plant capacity and an uncomfortably rapid decline in annual domestic sales per consumer (113.0 therms in 1951-52, 97.5 therms in 1958-59) made it imperative to increase sales of appliances, particularly those with strong load-building characteristics. He showed how new tariffs and such innovations as the scheme to facilitate central heating installations on a five-year repayment basis with interest at 4½%, provided salesmen with a new competitive weapon, and exhorted non-selling personnel, particularly meter readers, to enter whole-heartedly into the Board's prospects scheme.

Mr. Butters received vigorous support from the ebullient Mr. Frank Fisher, whose imminent retirement, alas, means that his stentorian tones may not be heard in gas circles again. Mr. Fisher is one of those rare birds possessed of the skill to transmit his own unquestionable enthusiasm to any number of people between one and several thousand. In contrast to his contribution to the discussion, and that of Mr. J. W. Rodgers, who was first man in after Mr. Wikstrom, the rest of the discussion was rather tame. Indeed, it wasn't discussion at all but a long series of questions and answers, the result of this being basically a conference of representatives of joint consultative committees. The 'discussion' served its purpose in that it permitted employees to voice their doubts and difficulties, while at the same time providing the management with an effective stethescope with which to gauge the heartbeat of the Board; but it also meant that the audience turned with a little too much gratitude to the diversion provided by one peppery delegate who placed a crumpled handkerchief over the red warning light lest it interrupt him.

If Mr. Wikstrom's printed paper was an informative but somewhat unexciting affair, his presentation of it was a joy, and some of the ideas he mentioned greatly intrigued his audience. For example, he reported a commission scheme in which the gas utility told em-

ployees' wives what their husbands would be able to buy for them if their sales efforts were successful, and followed this up with progress reports, an idea which we feel may well fill the average husband with dread but which seems almost certain to result in higher sales—or divorce. 'In the United States the best salesmen won't work on salary,' said Mr. Wikstrom. He also described a scheme called 'Using the User,' in which a salesman who has sold gas equipment to a housewife will promise to bring her a present if she can interest one of her friends in becoming a customer. And he told of a method employed in the States whereby a utility was prepared to advertise a builder's houses on television if he installed heating and cooking services by gas. Again, he dwelt on the extraordinary 'rebirth of gas lighting,' an example of which was the 8,000 gas lights sold in eight weeks in southern California, and mentioned the company which gave all its employees a day off in order to go out and sell gas lights.

Mr. Wikstrom's views on advertising were unusually interesting, particularly in his insistence on using the characteristics of one's fuel to best advantage. When the electricity industry made much play with the word 'flameless,' the American gas industry had come up with the slogan, 'There's something about a flame,' which deliberately emphasised the 'magic' qualities of the gas burner. And, referring to the room ventilation made possible by gas, Mr. Wikstrom remarked that they had a saying: 'Houses are like people; you enjoy them more if they're not stuffy.' Asked about the effectiveness of the A.G.A.'s television advertising, he said that they had used the same survey of 2,550 people for several years (at an annual cost of $30,000) and had found a five times greater preference for gas among viewers of the gas programme 'Playhouse 90.'

For the rest Mr. Wikstrom put in a strong plug for home service ('If you can find out what women want, and you have it, they'll buy it. Home service girls have taught me more about how to sell a range than anyone'); he was insistent that 'price is not everything'; and he expressed envy of the sales potential in this country. But he was diplomatic too: Asked what would happen if the American gas industry were nationalised, Mr. Wikstrom replied, 'I guess it would take us twice as long to recover as it did here.'

It seems to be becoming fashionable for area boards to import guest American speakers for their conferences, and experience thus far has shown that the policy pays off handsomely. They have a novelty value but, more significantly, they exude an infectious enthusiasm which, coupled with expert delivery, makes for both entertaining and therapeutic listening. There is no doubt that the Americans have given a great deal of attention to perfecting the pep talk. Even so, we might successfully participate in a little lease-lend. Watching Mr. D. P. Welman, the North Western Board Chairman, monocle and carnation in position and every inch the master of the situation, and listening to his dynamic address which concluded the conference, we could not help thinking that he would be a wow at an A.G.A. convention!

L.p.g.—Can they assist the gas industry?

LIQUEFIED petroleum gases became a real force in the fuel economy of this country when it was decided to increase the refinery capacity in Great Britain. Butane as Calor gas had become a commonplace in the country districts in the 1930's but it does not appear to have been a competitor in any way with town gas; in fact we understand that some town gas interests have assisted in its distribution.

To many gas engineers, the expansion of l.p.g. markets might seem possible only at the expense of the corresponding expansion of town gas sales. In an attempt, therefore, to clarify this particular point we are publishing this week an article by Mr. K. R. Garrett, Chief Chemist of the Calor Gas (Distributing) Co., Ltd., in which is set out the many advantages to be gained by the gas industry from the use of l.p.g.

Mr. Garrett quickly makes the point that the method of distribution of Calor gas has the very great advantage of portability. In the rural districts away from electricity and gas mains, this particular property is of the greatest value; so too is the high calorific value of the gas which increases the thermal content of the small, lightweight, convenient container to such an extent that provided the gas is not wasted, a container will hold sufficient gas for a reasonable period of use. This property of portability makes l.p.g. most useful for gangs of men working outside and requiring localised sources of heat.

The telephone repair gang will find the l.p.g. blow lamp more convenient than one using petrol or paraffin; the asphalter, who in the past has used a coke-fired appliance for melting his blocks of asphalt prior to use, can now more conveniently carry cylinders of propane as a source of heat. The use of l.p.g. as a fuel by fork-lift trucks working inside buildings is another example. Here the advantage is the much lower proportion of carbon monoxide in the exhaust gases, from a high grade gaseous fuel in place of a liquid fuel.

Such applications of l.p.g. are either complementary to the town gas industry's interests or completely independent of them.

Any means of making the public gas minded we wholeheartedly welcome and we think that in any movement of population from the country to the town, where public utility services are laid on, those accustomed to cook with Calor gas will welcome the even greater convenience of town gas supplies.

How does l.p.g. affect the manufacturing side of the gas industry? Undoubtedly the availability of a gas of high calorific value can be of considerable use to the industry. Here again its portability is valuable since potentially large quantities can be brought from the refinery to the gasworks by road tanker. Great care is needed in unloading it into the storage tanks at the works and all possible precautions against fire hazards or explosions must be taken when such large quantities as these are used. At the gasworks, l.p.g. may be used as enrichment for gas below the declared calorific value

or as peak load gas by dilution. However, because of the different combustion characteristics of such dilution mixtures compared with town gas, their proportion in the gas distributed should not exceed 10%.

The tendency today towards complete gasification of low rank coals is therefore likely to increase the demand for l.p.g. by the town gas industry. Since such plants have a very high potential output—the Lurgi plant to be built in the Midlands will have an output of some 100 mill. cu.ft. per day—the demand for gases for cold enrichment may increase enormously. If however coal hydrogenation is successfully developed, it may well supersede the present processes and the consequent falling off in demand for enrichment gas might prove something of a menace.

Mr. Garrett points out that production of l.p.g. in Great Britain exceeds the demand. Although the domestic use of these gases is increasing especially in caravans, it is unlikely to increase fast enough to absorb production. It is in this potential overproduction that we see the danger to the gas industry. Mr. Garratt calls for a recognition of l.p.g. as a fuel in its own right in the fuel economy of the country. As we have pointed out, there is no danger to the industry in the country districts but there might be considerable competition to be faced in the large industrial areas where after a sustained effort over many years, the industry has established itself as a means of supplying an excellent heat service to industry. It has been by the service given and the advice offered at every stage that gas has in many cases been successfully installed in competition with cheaper fuels.

There is no doubt whatever that l.p.g. has two advantages over town gas—it is almost completely free from sulphur and its composition is always uniform. Freedom from sulphur means that the products of combustion from l.p.g. will not affect the work being processed and uniformity of composition will ensure that combustion characteristics remain absolutely constant, a most important point when gas is used in automatic glass working machines.

Since the industrial load is the industry's most important outlet—over 50% of all gas sales in at least one board's area—great attention must be directed towards maintaining it.

The oil companies with their great resources will no doubt push l.p.g. as hard as they can and will put forward its many advantages—including its attractive price if taken in large enough quantities—to the large industrial gas user. The gas industry then needs to see that its product is the better of the two and greater effort should be made in the extraction of organic sulphur. Constant combustion characteristics are becoming increasingly important and we feel that a nation-wide production and distribution system might overcome any difficulty of this kind. An increase in the use of l.p.g. (butane) by the industry may go a long way towards absorbing the surplus, but there always remains the propane. It is doubtful whether l.p.g./air plants in small rural districts are really economic and in any case they are only small users, but some means by which l.p.g. can be virtually distributed through town gas mains on a really large scale might be advantageous to both industries.

Commentary on the News

Red light shines for H.P.

DURING his Budget speech on April 4 the Chancellor of the Exchequer, Mr. Heathcoat Amory, threatened to impose more credit restrictions, and as we go to press it is widely rumoured that he may tighten credit before the week is out. It is anticipated in some quarters that new Board of Trade regulations may require at least 20% down payment and not more than two years to pay. The object of restraining credit would be to reduce home demand for consumer goods such as cars, refrigerators and washing machines, most of which include imported materials. Home demand for these goods has risen to such an extent that they have been deflected from export markets and imports have been attracted in considerable quantities.

We do not dispute the fact that some curbing of hire purchase may be necessary, but we trust the Chancellor will exercise the greatest discrimination in devising his restrictions. It would be unfortunate indeed if he reverts to the short-sighted policy of placing controls on appliances which contribute to public health, such as water heaters and refrigerators, or assist in the Government's own clean air policy, such as room heaters.

In particular, however, we are thinking of the five-year credit schemes for central heating installations, such as that announced by the North Western Gas Board at their Area Conference last week. Here is the type of heat service which has everything to commend it from the national viewpoint. It makes the best use of coal, converting it to smokeless gas, and provides a high standard of comfort which could and should be within the reach of everyone. It would be sad indeed if such schemes were strangled at birth.

'Madam Tic-Tac'

AS an apt example of the old adage that practice makes perfect, take the Gas Council Dramatic Society. Fifteen productions since 1952 brought this ambitious company to a performance of 'Madam Tic-Tac' on April 12 which had much of the style and pace of a West End production. This was no namby-pamby family comedy but a tough, out-spoken thriller which made considerable demands not only on the players but on those behind the scenes too.

The play depends for its success on the strength of Madam Tic-Tac herself, the blind and deaf coffee bar proprietress who is the brains behind a gang of bank robbers. To successfully interpret her as a ruthless and authoritative figure, while retaining in the characterisation a strong thread of sympathy, requires a great deal of any actress, and Winifred Fraser played the role with exactly the right touch. It is perhaps invidious to single out other players, but special mention must be made of Eric Kerr as a cocky, ill-fated taxi-driver and Mary Duggan as a laconic tart with a heart. Jean Ellwood, Denis Scott-Wilson, John Edwards, Peggy Clarke, Joan Plank, Fred Jewitt, Frank Edwards and Ivy Miller all put up a fine show. As usual the man who brought out the latent talent was producer Tommy Cook.

If 'Madam Tic-Tac' created its special brand of mystery, it also brought to light another, unintended puzzle. The Rudolf Steiner Theatre was well filled, but where were the Gas Council's senior officers? They seemed to be uncommonly thin on the ground. The loss was theirs, however; they missed a splendid evening's entertainment.

A bulk propane installation of two 352-gal. spheres serving a chicken brooder installation.

L.p.g. in the fuel economy

Described by K. R. GARRETT, M.Sc., F.R.I.C.,
Chief Chemist, Calor Gas (Distributing) Co. Ltd.

IN the United Kingdom there are two main grades of liquefied petroleum gas (l.p.g.)—commercial butane for domestic use, and commercial propane with a higher volatility for industrial use. Fifty-fifty mixtures of the two have been used in the past but these are being replaced by propane.

In recent years the sale of l.p.g. in the U.K. has increased fairly rapidly. Over the last five years total sales have been more than doubled and should be more than doubled again in the next five years. The greatest increases in last year's sales took place in the use of propane by industry and the use of butane by the town gas industry for enrichment purposes. Last year the use of industrial propane jumped by 46% but domestic sales of butane showed signs of levelling out. It must be remembered that the weather was fairly mild and that other fuels, including town-gas, had reduced domestic sales.

High-priced but advantageous

The l.p.g. supply potential from the amount of crude oil refined in the U.K. is several times greater than present total sales. It is therefore reasonable and proper that a market be found for it. L.p.g. is generally a high-priced fuel which has many distinct advantages over other fuels. Obviously its exploitation is limited by its price and utilisation factors as compared with competitive fuels such as kerosene and fuel oil. It has already claimed its rightful place in the fuel economy of various countries, particularly in the United States, where approximately 17 mill. tons a year are sold, and it is a very healthy baby of the parent petroleum industry.

An appreciable amount of butane is added to petrol because it has a blending octane value of around 100 and it provides good starting characteristics in cold weather. The amount which can be blended is limited by the Reid vapour pressure of the petrol which, in the U.K. varies from around 7 to 13 p.s.i.g., depending on the season of the year. Up to approximately 8% by weight is added, depending on the concentration already in the petrol and whether winter or summer conditions exist. An overdose would give rise to vapour lock in engines.

Possibility of underground storage

It can easily be seen that less butane can be added in the summer months. Therefore, during this period more is available as fuel. To even-out this supply some form of large-scale storage would be advantageous. Consideration has been given to the possibility of using a method of underground storage such as that widely used in the United States.

L.p.g., including butadiene, is being increasingly utilised as a starting point in the manufacture of solvents, glycols, alcohols, tetraethyl lead, detergents, synthetic rubbers, resins and plastics. So far it has not been used in this country for the manufacture of acetylene—by the Wulff process, for example. Another outlet is the use of the fuel as starting material for preparation of high-purity hydrogen used for hardening edible oils and for hydrogen peroxide

rocket fuel manufacture. Many new processes for new end products remain to be exploited. These petrochemical applications are not covered in l.p.g. sales in the U.K. that I have mentioned.

Applications now cover a much wider field than town-gas, mainly owing to the ease under which l.p.g. can be liquefied and carried in relatively large amounts as liquid in pressure vessels of reasonable weight and thickness. Butane and propane as liquids produce respectively approximately 240 and 275 times their volume in gaseous form.

It is already well known that as Calor gas commercial butane is widely used for cooking, heating, refrigeration and lighting by communities outside the reach of the town gas mains. There it serves the interests of the town gas industry in that it makes the rural population gas-minded and supplies areas where it would otherwise be uneconomic to lay pipe-lines.

Where it would be uneconomic to supply electricity to certain islands off Scotland, the North of Scotland Hydro-Electric Board, in conjunction with the shipping and l.p.g. companies, is assisting in supplying butane at the same price as on the mainland. The scheme already covers the Orkneys, Rum, Muck, Eigg, Canna, Skerris and Yell.

A 156-gal. tank with hand-pump for filling fork-lift truck containers.

Caravan market almost unopposed

Owing to its portability l.p.g. is particularly suited to the requirements of owners of caravans, boats and mobile vehicles. It does not suffer serious competition from other fuels in this market. It is estimated that the number of caravans in the U.K. exceeds 250,000 and the number is steadily increasing. Approximately 60,000 are being used as permanent dwellings.

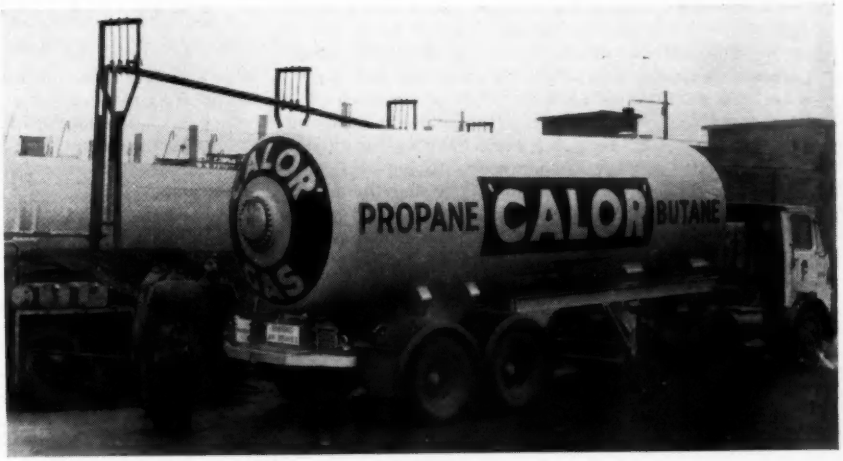
Mobile gangs, such as those working for the Post Office and electricity undertakings, carry it around as an easily controllable fuel for brazing torches, lead-melting pots, tunnel-drying, and last, but not least, cooking equipment. Gas-operated units are now available which simulate the comfortable conditions of the old-fashioned coke brazier. Mobile machines for heating the plastic used in laying white lines on roads, boilers for heating bitumen and asphalt, units for the heat-welding of plastic pipes, are all being changed over to l.p.g. Mobile gas-heated fish fryers tour the villages, providing a useful catering service to small communities.

With the extension of the do-it-yourself idea in this country, more and more small portable containers are being supplied for paint-burning, brazing, wall-paper stripping, lead-, tin- and glue-melting kits. Portable gas fires, search-lights, lamps and picnic sets can be clamped onto the gas containers. There is also a potential in the use of portable gas pokers. Builders are utilising portable heaters, with propane-operated fan motors for drying out houses in the winter months. The same units are used for all kinds of drying jobs in ships' holds, flood-damaged buildings, fire salvage, on-site paint stoving, etc., and for the rapid heating of large halls, hangers and marquees. One interesting application is the drying of cricket pitches to increase gate receipts in wet summers.

Rapid growth of broiler industry

The largest number of consumers of industrial propane comprise farmers who operate chicken brooder heaters, turkey rearing, pig farrowing, grain- and crop-drying units.

In the past few years there has been a rapid growth in the broiler or spring chicken industry. In 1959 approximately 75 mill. chickens were produced—a figure which is expected to increase to around 100 mill. in 1961. Broiler producers concentrate on raising 3-lb. chickens in eight weeks or 4-lb. chickens in nine to ten weeks. The present trend is for large, mechanised houses were one man can look after 10,000 to 20,000 birds. Propane is particularly suitable as a fuel, having a constant calorific value and



A ten-ton bulk butane tanker unloading at the Beckton works of the North Thames Gas Board. The use of l.p.g. for cold enrichment is receiving greater attention from the town gas industry.

ease of control. It is claimed that the humid heat from gas produces rapid feathering and increased growth of birds, as compared with the dry heat of electricity.

The fuelling of fork-lift trucks from butane bulk tanks is becoming more popular on account of reduced hazard to health from the exhaust fumes, lower maintenance costs and easier starting. As the l.p.g. arrives in the carburettor in gaseous form, more efficient air/gas mixing takes place and more efficient combustion results. This leads to a much lower carbon monoxide formation and almost eliminates carbon deposition in the cylinder. Thus, de-coking and sparking-plug cleaning are virtually eliminated and oil changes reduced. Also the exhaust gases are free from the lead compounds produced from the tetraethyl lead added to petrol as an anti-knock. As fork-lift trucks so often operate inside buildings, the decreased hazard from exhaust fumes is a very real contribution towards the health of the workers, besides eliminating contamination in food, drink and tobacco production.

For the same reasons many of the smaller stationary engines employed on industrial machinery, such as concrete mixers, are being converted to propane. But conversion kits will not be provided for engines operating machines requiring road fund licences.

Comparison with acetylene

Propane is often used in preference to acetylene for steel cutting because it is cheaper and because there is less tendency for the propane flame to harden the edges of the metal cut and to produce slagging. Thus, easier chipping and less grinding is required to clean up the edges. With propane and special torches, steel up to 5 ft. thick may be cut in a matter of minutes. Acetylene gives quicker ignition and start of a cut although, after starting, relative cutting speeds are about equal.

Propane/oxygen is unsuitable for ferrous welding, but it is used for preheating thick plate prior to welding. Propane is used by most metal sprayers for site work almost exclusively.

L.p.g. is employed as a propellant for aerosols, but it suffers the disadvantage that it is highly inflammable. It is much cheaper than the halogenated hydrocarbons such as the arctons and is a good solvent.

However, it is claimed that approximately 25% could be used with dichlorofluoromethane before a flammable mixture results. Newer formulations for aerosols include hair lacquers, paints, shaving soap, lubricating oils and wax polishes.

On heating equivalence, 1 cu.ft. of commercial butane does the work of approximately 7 cu.ft. of town gas of a calorific value of 450 B.th.u. per cu.ft., the sulphur in the products of combustion from l.p.g. is very low, and the gas is clean.

The town gas industry is showing more and more appreciation of the value of butane for cold enrichment. There are several schemes to increase this usage in the future. Peak-load enrichment by l.p.g. often prevents heavy capital expenditure on new plant and leads to a more efficient use of existing plant. Also, gas manufacture can be increased by this means during periods of retort maintenance. With the installation of Lurgi plants for the complete gasification of low-grade coals under pressure, there will be ample scope for enrichment by l.p.g. of the gas produced.

It has been suggested by Mr. J. P. Le Cornu, in a paper given before the London and Southern Junior Gas Association on December 11, 1959, that butane could be used for the enrichment of filling-gas for commissioning large gasholders. But it must be remembered that, on account of its high density and different combustion characteristics, there is a limit to the amount of l.p.g. which can be added to town gas.

The distribution of butane/air in the smaller works has been carried out successfully, but it is very doubtful whether these schemes have proved to be economic (ref. W. Idris Jones, *Journal of Institute of Fuel*, 1955, XXVIII, **177**, 500). Most of the smaller works' plants are being closed down and the works served by the gas grid. It is unlikely that any great extension of l.p.g./air plants will take place. It is a fairly simple problem to start a new l.p.g./air system from scratch but it is quite a different one when an existing town gas system has to be modified, particularly if the system is old, as it usually is.

While l.p.g. can be used for direct addition to coal-gas it does seem sad that such a superior fuel should be considered as feedstock for reforming plants.

Hand in hand with town gas

It can be seen that the l.p.g. industry is taking a more important place in the fuel economy, it serves the town-gas industry and walks hand in hand with it. To the future, who knows? With large amounts becoming available in the Sahara and Middle East oilfields, it may play an even more important rôle, particularly if the fuel cell, employing propane and oxygen, should produce electricity at an economic price.

New British Standard for flexible tubing

A NEW British Standard for flexible tubing or hose (including connections where fitted) for use in butane/propane gas installations (B.S. 3212:1960) specifies performance and test requirements. The following types of product are provided for: (a) Plain rubber, synthetic rubber or plastic tubing; (b) composite tubing and connections; and (c) high pressure, flexible tubing (including connections, where fitted).

Among the tests which the tubing is required to satisfy are those relating to: Extent of increase in outside diameter under pressure; strength, adhesion and stretch; performance when 'kinked'; resistance to gas, crushing and weather-cracking (ozone test).

B.S.3212 is one of the marks required to be clearly and durably marked on all flexible tubing. Manufacturers who are licensed to do so may apply also B.S.I.'s nationally-known monogram—the Kitemark.

Individual gas distributors and tubing manufacturers, the Gas Council and the Society of British Gas Industries were among many organisations whose experts contributed to the preparation of this specification.

Copies of the Standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1. Price 10s. (Postage will be charged extra to non-subscribers.)

The older worker

WITH the proportion of older workers in industry increasing it is vitally important for our economic progress that their skill and abilities are used to the utmost advantage. This is one of the points in 'The Older Worker and His Job', a popular and brief review by the D.S.I.R. of recent research in this field. (H.M.S.O., 1s. 5d. including postage).

Aluminium tanks for the sea transport of liquefied natural gas

By W. FERGUSON

THE choice of materials for liquefied natural gas containers is virtually limited to aluminium, austenitic steel, and copper. Ordinary low-carbon steel is not acceptable because of its brittleness at low temperatures. Of these three materials copper is too expensive for other than small containers, the extra cost over aluminium being at least 30%. Austenitic steel, although it has excellent engineering properties which go far towards offsetting its comparatively high price, also fails to compete economically with aluminium, the cost of a large welded container with appropriate fittings being some 15 or 20% higher than that of an aluminium one.

Aluminium thus seems the most suitable material for liquefied natural gas storage; and this conclusion is borne out by its current, albeit limited, use both for land installations such as the large reception tanks at Canvey Island and for the seagoing containers installed in the Methane Pioneer, the only ship so far equipped for this trade.

For the above reasons, and having in mind the probable future importance of sea transport of liquefied natural gas, Northern Aluminium Co. Ltd. decided to put in train a general investigation of the design problems associated with aluminium tanks for that purpose, as a useful accompaniment to research into fabricating techniques and the properties of suitable aluminium alloys. The results of this study, made by Aluminium Laboratories Ltd. at their Geneva office, are presented in this paper, which it is hoped may provide a background for actual designs to meet specific requirements.

The Methane Pioneer is a converted cargo ship of about 5,000 tons deadweight, and carries some 2,000 tons of liquid methane. The cargo at the time of the conversion (1958) was unprecedented, and the comparatively small scale of this prototype ship is admitted by the owners to be uneconomical. At the start of this present work, therefore, the views of several interested parties were solicited on the optimum size of ship and cargo, and the general conclusion was that a ship with the overall dimensions of a 30,000-ton tanker, and with a capacity for between 10,000 and 15,000 tons of liquid methane, would be appropriate for study. Apart from the general popularity of this size of ship, the loss of space for insulation and for access, amounting to perhaps as much as 8 ft. around each tank, would probably be a significant drawback in a smaller vessel.

The space available for tank storage is roughly rectangular in plan, so that tanks also rectangular in plan will clearly provide maximum capacity. The more conventional cylindrical tank with vertical axis, however, although less efficient in stowage, is lighter and cheaper to construct and therefore was also investigated. No other types were considered. It would not, in the author's opinion, pay to make tanks of irregular shapes to utilise the last inch of space in the hold, since the increase in overall capacity would be outweighed by the accompanying complexity of design and fabrication.

FACTORS AFFECTING SIZE

The number and size of tanks in a ship will be governed partly by the extent of sub-division required in the hull. Thus a close spacing of transverse bulkheads will mean either narrow rectangular tanks or rows of two or even three circular tanks athwartships. There are also a number of other factors that affect both the size and the disposition of the tanks, and which may be listed as follows :—

The normal depth of a 30,000-ton tanker is about 45 ft. If the usual construction were maintained, and allowing for the insulation and necessary clearances at deck and bottom, the tank height would not exceed some 35 ft. However, if the material in the deck were largely replaced by wing girders, a necked tank of perhaps as much as 55 ft. in height would become feasible; and by altering the type of ship to give an increased hull depth of, say 65 ft., tanks of still greater height could be accommodated. There would appear to be no fundamental objection to a deeper hull. The ship would, of course, be stiffer and its handling properties

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This abstract is of a paper presented to a symposium organised by Northern Aluminium Co. Ltd. at Aluminium Laboratories Ltd., Banbury, on April 12-13. The symposium was initiated as a result of increasing interest in low-temperature engineering since the North Thames Gas Board's Methane Pioneer trial shipments.

affected; but it is to be borne in mind that passenger ships have greater freeboards without incurring any penalty.

In the Methane Pioneer balsa wood was the principal insulating material. For bigger ships, however, it is doubtful whether good-quality balsa would be available in sufficient quantity, and it is therefore desirable to consider alternatives.

Because of this the type of insulation envisaged is a composite arrangement with balsa for the bases of the tanks where loading is heaviest, and foamed plastic for the sides and tops. To allow for expansion movements without damage to the balsa it is suggested that the tank should rest on a 2-in. layer of granulated cork or plastic which would be separated from the main balsa base by aluminium sheet, say $\frac{1}{16}$ in. thick. A total thickness of about 2 ft. should be adequate for the base insulation. For the sides of the tank the suggestion is a wall built of 18-in. thick foamed plastic slabs glued together to be self-supporting. The insulation for the top of the tank would be similarly constructed. The side and top insulations would be assembled just clear of the tank while it is at air temperature, so that they will stand free from interference by subsequent temperature movements of the tank.

EXPANSION MOVEMENT PROBLEM

The main problem in securing the tanks in the hull is that of their expansion movements due to changes in temperature between that of ordinary outside air (say 20°C) and that of liquid methane (−160°C). The number and extent of the temperature changes, however, is limited, being governed by the length of voyage and the regularity of deliveries; and it was deemed reasonable to assume that in the life of a tank there will be about 20 cycles of maximum temperature change (180°C), and about 160 cycles of partial temperature change. The latter was taken as 100°C although, since a small quantity of liquid methane will normally be retained during the 'empty' trip, it may well be as little as 50°C.

Two forms of tank mounting were considered. That for the circular tank consists of a central anchor at the bottom with stabilising struts at the top. The bottom anchorage consists of two downwardly-open channels set into the tank base in the form of a cross and each extending over the middle half of a diameter. From both of these channels short inclined baulks of balsa transfer any lateral forces to steel tees welded to the inner shell of the hull. The maximum expansion movements along the channels would be about $\frac{1}{4}$ in., an amount unlikely to cause damage to the balsa. The top of the tank is supported from a reaction ring with four tangential struts welded to it at right-angles to each other. The struts are connected to screw-jacks, through baulks of balsa for spacers and insulation, and the jacks are tightened to take up free movement as the tank cools during filling. The struts are short to keep temperature movements to a minimum. The horizontal load is at any time assumed to be carried by two struts only.

For the rectangular tanks the system is simpler, the arrangement being similar for both top and bottom. Non-adjustable balsa baulks are provided on two adjacent sides, and adjustable ones on the other two sides. When the tank is cooled it may be expected to contract away from both the fixed and adjustable supports; but as the amount of liquid will be small at this stage it should be feasible to move the tank bodily by the adjusting jacks to its cool position.

The full cargo of liquid methane will not be more than half the deadweight capacity of a 30,000-ton tanker, and it will be necessary to ballast the ship accordingly. If all the required ballast were put in the lower part of the hull the result would be a ship with very quick motion and with correspondingly high accelerations that are undesirable for tanks containing liquid methane. To keep the rolling acceleration within acceptable limits it will therefore be desirable to incorporate high-level ballast tanks, possible in the wing girders below the deck.

Access around all the tank is obviously essential for inspection and maintenance of the tank insulation and also of the ship structure itself. While 2 ft. 6 in. is a normal minimum for walkway width it is thought that in the kind of ship under consideration, where the chief purpose will be for inspection—maintenance being expected to be necessary only at infrequent intervals—a width of 18 in. could suffice. The additional capacity represented by an extra 2 ft. in tank dimensions would be extremely useful, and in the case of circular tanks the narrow parts of the access-ways would only be of limited length.

Inspections at one-year intervals will probably be required for the insides of the tanks to examine the condition of the material and of the joints. The outsides of the tanks will probably be partially examined once in eight years; and with this long interval there seems insufficient reason for arranging the insulation to be demountable.

Certain safety precautions will be necessary with a cargo of liquid methane, and will affect the general design of the installation. Thus, to obviate the risk of chilling the hull plating to brittle-fracture temperatures a double skin will be required that can be flooded in the emergency of tank leakage or breakdown of insulation. It may also be that even under ordinary operating conditions the inner skin will have to be heated by the same means. Another possible danger arising from tank leakage is that of an explosive mixture of methane and air. To avoid this it may be necessary to fill the inter-tank hull spaces with an inert gas such as nitrogen: this would mean that the inner skin would have to be gas-tight.

A material for sea-going liquid methane containers must possess adequate mechanical properties that are not adversely affected by very low temperatures, together with good forming and welding characteristics and good resistance to maritime corrosion. It should, moreover, be commercially available at an economic price and should preferably be an established standard material readily accepted by underwriters and the classification societies.

EXPERIENCE OF ALLOY

Those requirements are all met by the 4 to 4.5% magnesium alloy—Noral B54SM—that is normally supplied to meet the NP5/6 specification of B.S. 1477 : 1955. Considerable experience with this alloy has accumulated since the war, and the facility with which it can be fabricated is illustrated by the welded superstructures of the recently-built liners Oriana and Canberra, which between them account for some 2,000 tons of this type of material. Its corrosion resistance is extremely high and, unlike the heat-treatable aluminium alloys, it suffers no significant loss of strength by welding.[1] Noral B54SM was therefore selected as the material proper for consideration in this design study.

For aluminium alloys the working stress normally acceptable to Lloyds Register of Shipping appears to be one half of the proof stress or one quarter of the ultimate stress, whichever is the less. For Noral B54SM, the appropriate figure is 4 tons per sq. in., being one half of the specification proof stress.

However, in the present case of tanks subject to the fluctuating loads caused by rolling, pitching and heaving, it was felt that some consideration should be given to fatigue and to the fact that many of the welds are located in the more highly stressed parts of the structure. After due consideration it was decided to use throughout a

slightly lower working stress level of 3½ tons per sq. in., giving a factor of safety of 2.29 on the specification proof stress.

The fatigue characteristics of butt welded joints in aluminium plating have been discussed by R. J. Durham[2], and a limited number of tests on low temperature fatigue[3] indicate that with a fall in temperature there is a marked improvement in the fatigue resistance of welded B54SM joints, and that for design purposes, results obtained from room temperature tests, can safely be used, indeed providing an added factor of safety.

The detailing of any specific tank is naturally governed by the size of plate available. Northern Aluminium Company Ltd. are currently carrying out a plant improvement scheme, due for completion in 1960, which will enable the supply of 2-in. thick plates (the heaviest considered in this study) up to about 10 ft. by 21 ft. in size, the largest available in Europe; for plates less than 2 in. the maximum length will be correspondingly increased. Because of the economies made possible in fabrication by the use of large components, the maximum size of plate available from this new plant has been used in detailing these designs.

UNAVOIDABLE EVAPORATION

The density of liquid methane has, for the purpose of this study, been taken as 26¼ lb. per cu.ft. at −160°C., although where methane is found mixed with other petroleum gases a density of up to 37½ lb. per cu.ft. is possible.

Since there is an unavoidable evaporation of methane during the voyage, a certain gas pressure will always exist in the tanks. This has been assumed to be limited by suitable relief valves to 2 lb. p.s.i.

At the start of the study there was some difficulty in obtaining firm opinion on the maximum acceleration, due to the combined effects of rolling, pitching and heaving, that should be assumed for design purposes. The figures set out below, which are based on information obtained later, give results slightly different from the estimate of .25*g* for pitch/heave and .25*g* for rolling used in the study. This difference, however, would have little effect on tank weight and none on the general principles or arrangement.

These later figures, now put forward as a reasonable basis for future design, are:

Rolling:	Amplitude 25°
	Period 10 seconds
Pitching:	Amplitude 7°
	Period 10 seconds
Heaving:	Amplitude 10 ft.
	Period 10 seconds

Information[3] indicates that more severe individual movements may sometimes be experienced, but it is thought that normal factors of safety would make ample allowance for these. The accelerations due to rolling and heaving affect all tanks equally, but that due to pitching is in each case proportional to the distance of the tank from the centre of pitch. Thus, the central tanks are loaded to a lesser degree than those well forward and aft.

The temperature range experienced by a tank will be of the order of 180°C., extending from air temperature at, say, +20°C. to the temperature of liquid methane at −160°C. However, this range of temperature in itself is meaningless and it is necessary to know the actual temperature gradient likely. From already published comments it appears that a temperature difference of 56°C. over a distance of 4 ft. is the worst that can be expected. This figure is dependent to a certain extent on the insulation, since under working condition good insulation could decrease the gradient and poor insulation increase it.

Since the tanks will shrink away from the insulation when taken down to working temperature it seems reasonable to limit the tank deflection to the contraction by cooling. The deflection in any case should be kept as low as possible, in order to minimise the risk of damage to the insulation by contact with the tank.

The loading conditions have already been discussed and now it is necessary to show their effect on a tank.

Considering first the effect of liquid head in the tank, it is obvious that with no rolling the pressure on a horizontal plane is the same at all points. However, if the ship is rolling to an angle θ, a pressure diagram across the tank on a plane parallel to the base can be calculated.

For cylindrical tanks of the dimensions necessary for the economic transport of liquid methane, it is impracticable to have plain shells without stiffeners since the shell thickness would be outside production limits.

The type of tank considered, therefore, is one having stiffening rings parallel to the base to resist deformation due to asymmetrical loading across the tank. As mentioned previously, there is a top reaction ring to transfer load from the tank to the ship's hull, and a cruciform anchorage in the tank bottom for the same purpose.

The general arrangement of such a cylindrical tank comprises a cylindrical shell, stiffening rings, a reaction ring, the base, a conical top, the dome, and knee brackets between the reaction ring and the top stiffening rings.

The most economical way of covering the top of the tank appears to be with a dome, since this does not require an internal structure for its support. Two sets of loading conditions exist for this dome, one caused by gas pressure on the inside, setting up tensile stresses, and the other by deadweight and insulation, causing compressive stress. Of the two, the external loading is much more severe and if the dome can withstand this loading the other can be ignored.

The design of rectangular tanks is basically more simple, since the elements of the tank can be calculated with more certainty. In a typical design of tank the shell plating is either of formed plate or of plate with internal stiffeners, both systems being continuous for the depth of the tank. To transfer the loads to the hull, reaction girders of box-section are placed at the top and bottom of the tank and stiffening girders are spaced between top and bottom to support the shell plating. The tank bottom is flat, while the top consists of a series of arches. In small tanks one cylindrical arch is sufficient. The top could, of course, consist of flat stiffened plate. The loads caused at the reactions by the deadweight of the tank may be calculated exactly as for the cylindrical tank.

FORMING SUITABLE PANEL

In the contraction of the shell, corrugated panels of symmetrical cross section are not particularly suitable, since considerable space is wasted, but by using an asymmetrical cross-section less space is wasted and a suitable panel is obtained. The panels are considered as fixed-ended beams, and as the pressure increases with depth the maximum stress in each panel will occur at the lower junction with the stiffening girder or reaction girder. The hoop stress is obtained by treating the curved panel as a cylinder.

However, such a corrugated structure would cause considerable fabrication problems, and it is probable that stiffened plating would be preferred. For design purposes this system can be treated as the corrugated panel system, except that in places of hoop stress a panel stress is substituted.

To compare the suitability and practicability of tank types and their arrangement within a ship's hull, a drawing was appended to the original paper, showing the

possible arrangement within the ship of six different types of tank that have been studied.

The simplest design considered consisted of 17 tanks, 35 ft. in diameter with a total capacity of 9,775 tons. The upper 5 ft. of the tank was formed by a dome resting on the top support ring, and bottom support was provided by a cruciform anchorage in the base as previously described. Two rings at 16⅔ ft. and 33⅓ ft. from the base served to keep the tank in shape under load.

The advantages of this arrangement are low material cost and low fabrication cost; the tanks could be fabricated in the shop and placed in the ship after launching. On the credit side also, the loss of stability due to free surface is reduced to a minimum by using small diameter circular tanks. Its disadvantages are the large number of supports necessary, the amount of pipework for filling and discharging and the amount of insulation required, which is about 20% more than for five tanks twice the diameter.

Another design shown comprised five cylindrical tanks within parallel sides, 70 ft. in diameter with a total capacity of 10,375 tons. A third design consisted of nine rectangular tanks constructed of corrugated panels 71 ft. by 23 ft. Rectangular tanks have the obvious merit of efficient use of space. The supports in this case are at base level and at the 50-ft. level, with three intermediate rectangular girders. The top and bottom girders are of box-section. Spanning vertically between the girders are circular corrugated plates of 32 . radius at 70¼-in. centres. The top is a cylindrical sh . Owing to the small fore-and-aft dimensions of each ta , the benefit of the rectangular shape is partly lost in add i insulation space and clearance.

Carrying capacity is probably the most important featu e of a ship to carry liquid methane, and the rectangular tan s with flat stiffened panels are the most suitable from th s point of view. When considered against the 35-ft. di - meter cylindrical tanks, it will be noticed that the tan weight in the ship is increased by 133%, but at the san time the cargo capacity is increased by over 50% and th amount of insulation, supporting structure and pipewor is reduced. It is, in fact, probable that the total cost o the ship equipped with rectangular tanks so as to giv maximum stowage would only be about 20% more tha if the cheapest type of circular tank was used.

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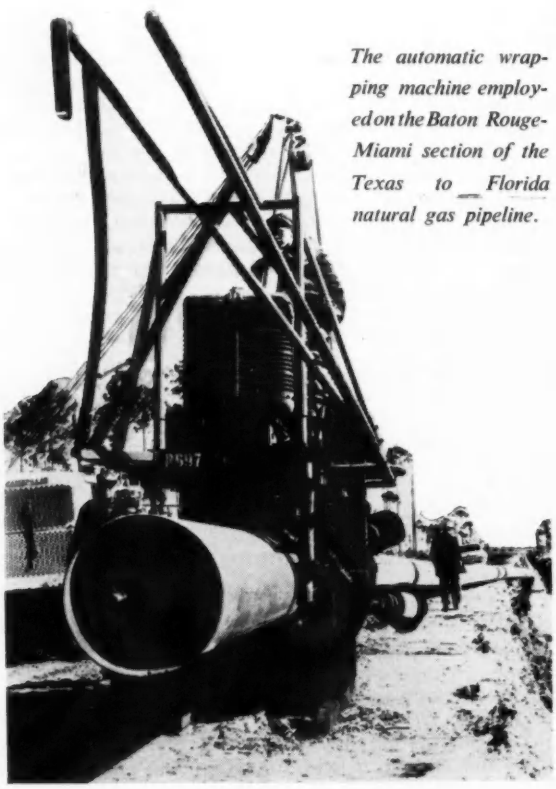
LARGEST SINGLE PIPELINE PROTECTION JOB USES 41.5 MILL. SQ. FT. OF POLYETHYLENE



The automatic wrapping machine employed on the Baton Rouge-Miami section of the Texas to Florida natural gas pipeline.

CLAIMED to be the largest single pipeline protection project ever carried out, the encasing of a 1,616-mile (914 miles of mainline and 702 miles of laterals) section of the Texas-to-Florida, U.S.A., natural gas pipeline in a polyethylene sheath to protect the line from corrosion, is almost complete.

More than 41.5 mill. sq.ft. of polyethylene tape was used to coat the Baton Rouge, Louisiana to Miami, Florida section of the line. The tape is 14 mils. (1 mm.) in thickness and is spirally wound on the pipeline from rolls 18 in. wide and 800 ft. long. In one day's operation on the Florida job, 17,000 ft. of line was taped by a single machine and crew. Taping is much faster than older methods of pipeline coating.

Use of the tape permits pipe to be laid and covered with less distance separating the welding crew at the front of the operation from the crew which covers the pipe after taping is complete than was the case with some former methods. A single piece of power equipment cleans the line and applies the tape. This speedy operation contrasts with other coating methods, requiring long drying periods before the pipeline can be covered. This factor was particularly important in sandy, marshy terrain where cave-ins were frequent. The terrain traversed by the line is reported to be among the worst ever encountered by pipelines.

Polyethylene tape, manufactured from a compound produced by the Union Carbide Corporation, was used by the Houston Texas Gas and Oil Corporation, Houston, Texas, U.S.A. in this vast pipeline protection scheme. It is claimed to have saved more than $500 per mile over the conventional protective coatings such as tar, or more than $800,000 for the 1,616-mile section. It is expected that maintenance costs also will be lower because of the polyethylene coating which was used on the Baton Rouge, Louisiana to Miami, Florida section.

CHAIRMAN'S PRICE PLEDGE

North Western conference delegates examine future

NEWS SUPPLEMENT

AN undertaking that the North Western Gas Board would hold the price of gas, despite the fact that this year it would make a loss greater than last year's £½ mill., was made by Mr. D. P. Welman, Chairman of the Board, at last week's Area Conference at Southport. 'We will not live, even temporarily, on money lent to us to keep us on our feet,' said Mr. Welman. 'Instead we shall do what we have done before—find the money by more economy and increased efficiency.

Mr. Welman began his speech by reviewing the Board's progress during the first ten years and concluded that they 'haven't done too badly.' Working conditions, plant efficiency and consumer service had all improved beyond all recognition.

Referring to the introduction last year of the Board's new tariffs, Mr. Welman regretted that the printer's strike had hampered their efforts to honour their statutory obligations by adequately informing their consumers. Responsibility for putting over the tariffs had therefore fallen on district staffs who had done 'an absolutely first-class job,' the average cost of visiting each consumer being as low as 6d.

Competition welcomed

Turning to wider issues, Mr. Welman pointed out that gas was one of four main heat-selling industries, all in competition with each other. Competition with coal was not likely to be so serious as in the past, but competition with electricity was very keen indeed. They welcomed it, provided that they were met by ethical selling methods on a fair basis and the electricity industry sold to the domestic and industrial markets at prices directly related to giving services to those consumers.

It was likely that the electricity industry would bring down the cost per unit from .54d. to .5d., said Mr. Welman, but it was unlikely that atomic power would help them for a long time to come; electricity from atomic power stations was likely to be 50% higher than that from the best thermal stations.

Golden opportunity

'The oil industry is a very, very important competitor,' said Mr. Welman. 'It has absolute freedom of control over its own household and is unaffected by direct Government action.' While still finding it difficult to make inroads into oil business in the industrial and commercial heating fields, the Board could now, for the first time, offer gas for whole house heating at a lower cost than oil. 'We have got to hold our position and we are going to hold it,' said Mr. Welman, 'for we have a golden opportunity.'

Oil usage had increased 80% in five years, while coal usage had dropped 10%. Yet they had the ridiculous situation whereby, despite changes in the habits of the people and a constant move towards labour saving, they had the Coal Board solemnly selling central heating by coal in the same way as oil. The idea of using raw coal for this purpose was ludicrous.

Ridiculous notion

'We have the opportunity to offer to the housewife and to industry the ideal method of central heating, but instead of getting together intelligently with the Coal Board, we are at war with them on central heating.' It was ridiculous to think that anyone was going to use any solid fuel in this way. 'However,' added Mr. Welman, 'it will not be long before we are able to see the light together.'

'If we can get the right price per therm, the ball is at our feet. We could sell more central heating in a week than

Continued on p. 151

N.W.G.B. offers central heating easy-term plan

AN important new development of the North Western Gas Board, announced at their Area Conference at Southport, was the introduction of a new central heating service with interest charges at 4½% and the installation costs spread over five years. Free insurance of the outstanding balance is provided for householders under 60 and every installation is backed by five years free servicing with free replacement of any defective parts in the first year. The new service is to be widely advertised under the heading 'Gas central heating installed for as little as 7s. 6d. a week.'

Commenting on the scheme, Mr. Harry Butters, North Western Board Member, said: 'Until a week ago we could not match the marketing terms offered by oil. Now we can beat them. This is our golden opportunity.'

Mr. D. P. Welman opening the North Western Gas Board's Area Conference at Southport last week. Also in the picture are Mr. F. Wikstrom, Director of PAR to the American Gas Association, and the Mayor of Southport, Alderman W. Berwick.

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North Western Gas Board's annual conference—from p. 147

the Coal Board could sell in five years. I believe commonsense will prevail.'

The cost of coal was 75% of the cost of gas making, and the persistent increases in price since vesting day had had the result of worsening the gas industry's position. Today they were faced with great financial difficulty because cost and price were so close that mere variations in temperature could put them into the red.

Cheapest gas

However, over the ten years since vesting day the Board had shown an average return per year of over £¾ mill. That showed that they had honoured their obligations under the Act, and the good work put in by their employees had helped to maintain in the North West the cheapest gas of any manufacturing board in the country.

Last year they had made a loss of just over £½ mill., and they were going to make an even bigger loss in the year ending March, 1960. The whole of their deficit last year and this year had been directly attributable to loss of business. In 1958, working on a thin margin, they had been faced with a slump in industry; in particular the slump in the cotton industry had had a tremendous effect on them. Coinciding with the slump they had had a mild winter and all this had resulted in a fall in output of 8 mill. therms. In 1959 they continued to suffer the hangover of the industrial depression and they had had to face a temperature condition, winter and summer, 3° above average. This had reduced the load by a further 12 mill. therms. Therefore in two years they had lost 20 mill. therms and well over £1 mill. of revenue. Moreover, they had not sold coke to anything like the same degree, resulting not only in a further loss of revenue but in the added cost of stocking and making water gas.

Mr. Welman said they were not worried about making a loss for a good reason, if it were a temporary measure and a proper way of consolidating their forward position. But they could not and would not allow their reserves to run into the red; they would not live, even temporarily, on money lent to them to keep them on their feet.

Economy possible

What, therefore, could they do about it? They were not going to increase the price of gas. Instead they would do what they had done before—find the amount from within their own compound. 'It is no longer easy to make savings, but don't let any of us fool ourselves that there is no more economy or improved efficiency possible.'

They were going to find the money in four ways: By cutting capital expenditure of every kind to the absolute minimum; by achieving the maximum possible economy in operation; by going out and selling the maximum possible number of appliances, particularly those like central heating which brought in a good return; and by improving their advertising.

'If we can hold on to our present position,' concluded Mr. Welman, 'in three years we can place ourselves in an even more competitive position in respect of electricity and oil and make a profit. We can double the output of gas in this area in ten years if we can get the price right and the cost of raw material right.'

Two authors and a new idea. Mr. F. Wikstrom, Director of PAR to the American Gas Association, and Mr. H. Butters, Board Member, both of whom presented papers at the North Western Area Conference. They are looking at the Board's new character, Mr. Digger, who will symbolise the keen digging for prospects which it is hoped will follow the drive currently being made with the prospect scheme. Mr. Butters particularly emphasised the importance of employees giving sales leads which could result in valuable business.

Selling prospects

Throughout the conference the emphasis was entirely on sales. Of the two papers presented, the first, by Mr. Harry Butters, Board Member, dealt with 'Selling Prospects' and brought forth an impressive discussion opener by Mr. Frank Fisher, Commercial Manager of the Mersey Group, who hailed the paper as a challenge to all personnel and who referred particularly to the £27 per annum spent by the majority of their customers on solid fuel—'That's the market we're going to take over.'

The second paper, a dynamic presentation by Mr. S. F. Wikstrom, described the function of 'PAR for the American Gas Industry'—PAR standing for promotion, advertising and research. The PAR plan is now in its sixteenth year of co-ordinated activity by the American Gas Association. Mr. Wikstrom's paper, like Mr. Butters', is to be published in next month's *Gas Service*.

At the conclusion of his paper Mr. Wikstrom received a tremendous ovation and an interesting discussion ensued, sparked off by the contribution of Mr. J. W. Rodgers, the Board's Sales and Service Officer.

The remainder of the conference was devoted to questions and answers concerning a wide variety of subjects, most of them on aspects of the Gas Board's policy.

The fact that Denton had been described as the last gasworks of its kind was mentioned by one questioner who asked: What of the future? Replying, Mr. W. Hodkinson, the Deputy Chairman, agreed that Denton was the last, or almost the last, carbonising plant and said that they were being driven to look for new processes, particularly high pressure. Their aim was to make synthetic natural gas from coal by a high pressure process.

New forms of gas supply were also mentioned by Sir Dennis Proctor, Permanent Secretary to the Ministry of Power, a guest at the conference, who referred to the Board's plans to take refinery gases from Stanlow. The Coal Board had been unable to offer a cheaper solution to the problem, he said, but the Gas Board had kept the N.C.B. in the picture regarding their intentions, a type of co-operation he endorsed.

On the evening before the opening of the conference a reception and dance was held at the Floral Hall, Southport, which was also the conference venue.

North Western Gas Board's annual conference

BOARD COULD SELL 16% MORE GAS

—without expenditure on production plant

AN exhortation to 'go the extra mile' by digging for prospects was the theme of 'Selling Prospects,' the paper presented to the North Western Area Conference last week by Mr. Harry Butters, the Board Member who in recent years has been intimately associated with sales efforts in the area.

The paper began with a review of the Board's progress to date and an examination of present trends. Compared with the year 1955-56 total sales have fallen by 7%, the peak day demand dropping by nearly 10%. Mr. Butters pointed out that this meant that the Board had some 60 mill. cu.ft. of production plant unemployed on the day of peak demand.

Contribution to revenue

'Because we have this spare plant capacity, we have in effect the opportunity to sell 16% more gas without incurring any extra expenditure on production plant.' Mr. Butters explained how, if they succeeded in selling 10% more gas over the next four years, an extra £1¼ mill. per annum in gross income would be gained, one-third of which would be a contribution to the Board's revenue.

Turning to the question of tariffs, Mr. Butters pointed out that since vesting date the average consumption per consumer had fallen from 113 therms to 97.5 therms per consumer, and that a 1957 sample survey had shown that some 37% of prepayment and 46% of credit consumers used under 80 therms per annum.

Sales potential

Only 1 in 7 consumers used any type of gas fire or radiator, while more than 1 in 2 consumers used some form of electric heater and 1 in 6 an oil heater. Only 1 in 8 had a gas water heater, 1 in 2 had a gas washer or wash boiler, and 1 in 10 had a gas refrigerator.

There followed a detailed examination of these loads, emphasising their sales potential and the incentive provided by the Board's new tariff.

Dealing with the steps the Board had taken to improve their sales activities, Mr. Butters instanced their decision to double their existing outside sales force and the evolution of a new commission scheme, and finally turned to the main purpose of his paper—the introduction of a successful prospect scheme. The best results could be traced to those districts where there were enthusiastic section heads and, in many cases, to first-class district service managers.

Suggesting to all personnel who have consumer contact that there was an excellent opportunity for them to secure prospects, Mr. Butters pointed out that meter collectors were in a particularly advantageous position. He instanced one case in which meter readers were temporarily transferred to canvassing and in which, by the end of the campaign, these men brought in 400 successful leads out of a total of 485 water heaters actually sold; one man alone was responsible for 200 of these sales.

How promotion programmes doubled America's annual sales in a decade

THE other principal speaker at the conference, Mr. S. F. Wikstrom, Director of Promotion, Advertising and Research to the American Gas Association, described how PAR—the initials of the activities named in his title—helps the American gas industry.

Much of his paper was concerned with the allocation of funds for various activities by the A.G.A., which 'is an organisation of individual gas companies working for the mutual benefit of all members.'

First, however, Mr. Wikstrom briefly reviewed the industry's performance over the past decade. During this period annual sales of gas were doubled, and the proportion of American homes enjoying gas service increased from 65% to 77%.

This success was largely due to 'the establishment of new and revitalised programmes for promoting, advertising and selling gas to consumers from coast to coast,' made possible by the decision of pipeline companies and utility companies to join in a voluntary association to support a common front.

In 1960 the PAR budget calls for an expenditure of $8.1 mill., including television which is responsible for $3.5 mill. The latter medium formed the subject of the opening part of Mr. Wikstrom's paper.

The author described how 'Playhouse 90', a dramatic show nationally televised on a network of 130 stations, had been utilised to put over the right sales message while at the same time dominating the nation's annual T.V. awards. Its cost was $600 per second, which meant that customers and prospects were being reached at a cost of one-third of a cent per visit.

Having shown how this advertising medium was supported in various ways, Mr. Wikstrom turned to the Gold Star campaign—a campaign designed to spotlight gas appliances of the highest quality. Launched in January, 1959, range sales rose by 12.3%, gas 'built-ins' by 65.7%. A second Gold Star promotion covering water heaters would be launched this year.

The author described at some length the ways in which glamour was imparted to their sales efforts by ensuring that gas kitchens were widely featured in films and periodicals. He emphasised, too, the value of the Mrs. America contest and instanced various ways in which the gas message was brought to young people.

By 1970 there would be 11.7 mill. more households in the United States and the gas industry was out to capture as much of this market as possible—including lighting. Last year an estimated half a million gas lights were sold. 'In fact', added Mr. Wikstrom, 'more gas lights are burning today in the United States than 50 years ago when gas lights reached their peak. And these gas lights produce more revenue than a gas range.'

The author devoted considerable space to the industrial and commercial load on the advertising of which $75,000 was spent out of a total budget of $385,000. Seminars had been sponsored on heat processing for a number of industries. From 1953, through 1958, their commercial revenues had increased 69% and their commercial gas volume 54%; consumers had increased by 20%.

Turning to the R in PAR—research—Mr. Wikstrom revealed that there were 70 different research projects in as many fields being conducted. Plans for 1960 called for a $2.5 mill. research programme, a major share of which would be directed to home appliances. Work would be done on fuel cells, thermionic and thermoelectric generation.

'We shall never be able to match our competition dollar for dollar,' concluded Mr. Wikstrom, 'but we have more than a quarter million devoted employees who make our ads. and promotions better than our competitors. These 250,000 people are well informed public relations officers for our industry.'

Company news

PARKINSON COWAN LIMITED

Mr. Hugh P. Barker's review

THE annual general meeting of Parkinson Cowan Limited was held on April 25 in London. The following is an extract from the statement by the Chairman, Mr. Hugh P. Barker:

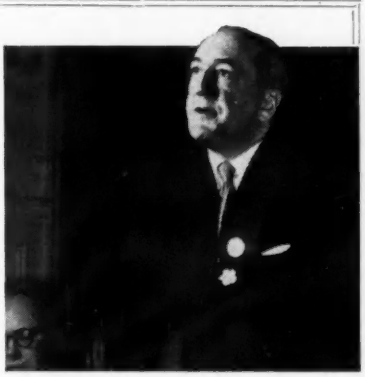
Our gross trading profit was £728,000 (£362,000 last year). Offsetting this we have had to increase our depreciation provision to £179,000 (£113,000 last year). The resulting profit before tax of £550,000 compares with £298,000 last year. Our tax bill is heavily increased at £269,000, which leaves a final net profit of £281,000 compared with £199,000 last year. Our earnings on Ordinary Stock calculated on a currently accepted basis show a return of 57%. Your Board proposes to pay a final dividend of 10% and a bonus of 2½% which, together with the 5% interim already paid, makes a total distribution of 17½% for the year costing £80,000. After allowing for preference dividends already paid (£21,000) this leaves £180,000 to be distributed among the reserves and surpluses of the Group.

The high profits earned in 1959 were a direct result of the boom conditions in the domestic appliance market. We achieved a record output of cookers and increased our share of this market. The appliance business as a whole shows signs of tightening up, and I think it unlikely that 1960 will repeat the performance of 1959, though we expect to do well.

Our Meter and Instrument Divisions had a poor year though towards the end business improved and is now running at a very satisfactory level. We have a first-class range of gas meters, which we are selling on a world-wide basis. Our business in liquid meters is also improving rapidly. Our Industrial Products Division has done well and is steadily expanding; the business of the Division is industrial heating, both for buildings and for drying processes.

My views about the future of this Company have changed very little during these last years. We have a sound business, a good reputation and a catholic spread of interests. We have an excellent executive team, and many of our 3,000 employees have years of loyal service behind them. The pressure of commercial competition is nicely balanced by the pressure of opportunity. In this equilibrium your Directors hope to sustain the interests of our stockholders and employees alike. We expect to have a good year in 1960.

The report and accounts were adopted. *Copies of the report and accounts can be obtained on application to the Secretary at Terminal House, Grosvenor Gardens, London, S.W.1.*



Mr. Hugh P. Barker, Chairman of the Parkinson Cowan Group and chairman-designate of the British Institute of Management, opening the Parkinson Cowan Group sales conference held in London recently. The programme was devised to enable divisional sales managers to review the latest products for gas-using and producing industries and developments in domestic gas appliances. Over 100 members of the Parkinson Cowan sales staff attended the conference.

DEVELOPMENTS DISCUSSED AT I.G.E. WORKS ENGINEERS COURSE

PEMBROKE College, Oxford, was the pleasant site selected for a short course for works engineers held earlier this month by the Institution of Gas Engineers. Fifty Institution members attended—45 from area gas boards and the remainder from contracting companies.

The aim of the course was not to offer a platform for the presentation of highly specialised papers but an opportunity for engineers normally occupied fully with day-to-day activities to exchange opinions with their colleagues and get up to date on the latest developments.

The programme consisted of lectures and discussion on topics suggested by the lecturers by ten-member syndicates. Among the lecturers were Mr. J. E. Davis, O.B.E., Chief Technical Officer, South Eastern Gas Board, who spoke on 'Raw Materials and Basic Processes'; Mr. E. O. Rose, Chief Engineer, Eastern Gas Board, on 'Structures'; Mr. L. J. Clark, B.E.M., Development Engineer, North Thames Gas Board, on 'Steam and Power in the Gas Industry'; Mr. A. E. Haffner, Chief Engineer, Southern Gas Board, on 'Inoffensiveness'; and Mr. T. A. Lucas, Instrument Engineer, South Eastern Gas Board on 'Instrumentation.'

Installing a butane plant at Aberdeen

THE East of Scotland Junior Gas Association met in Aberdeen on April 9 to hear a joint paper by Mr. C. S. Smyth, Production Engineer and Mr. J. E. Scott, formerly divisional technical assistant of the Scottish Gas Board at Aberdeen.

Entitled 'The Installation and Utilisation of the Butane Plant at Aberdeen,' the paper dealt with the advantages of the butane/chimney gas addition, the choice of plant and the limitations of siting it. Presentation of the paper was made especially effective by the projection of some excellent colour slides.

CORRESPONDENCE

VETERAN METER

DEAR SIR,

In your issue of March 23 there was a reference to the unbroken service of an 'Alder' improved dry gas meter made in 1865.

It is a tribute to the material (tinned iron) and to the craftsmanship of the tinsmith who beat out the panels by hand that the original case is perfectly sound, and that the meter was registering.

The economics, however, of such longevity in a meter are doubtful. On test it was 50% slow and the only one to mourn its passing would be the consumer!

Yours faithfully,
STANLEY BENNET,
Director, U.G.I. (Meters) Ltd.
April 12, 1960.

PRODUCERS

DEAR SIR,

Your editorial of April 13 on mechanical producers has caused some surprise. One would have thought that the majority of major installations of vertical retorts erected in the last 20 years or so were equipped with some form of mechanical producer. And the hot gas producer in more than one arrangement has been a conspicuous success. A considerable number are working, using all grades of coke, provided that the dust is removed from it.

Yours, &c.,
T.A.T.

Albion Ironworks,
Miles Platting,
Manchester, 10.
April 22, 1960.

OBITUARY

F. M. Birks—an appreciation

MR. F. M. BIRKS, C.B.E. whose obituary notice was published last week, was past-president of the Institution of Gas Engineers. He had for many years represented the Institution on the council of the International Gas Union, of which he was also a vice-president. Dr. J. Burns, G.M., past-president of the Institution, has submitted the following appreciation :—

Inventive of mind and original in thought are two expressions which easily come to mind when thinking of the late Falconer Moffat Birks.

He was, in his day, a great mechanical engineer and it is in this important section of gas engineering that he has principally left his mark. He exercised his skill at Beckton when he joined the Gas Light & Coke Company in 1921 as mechanical engineer and there he set his standards of efficiency and reliability, the effects of which are still felt to this day. He recognised the abnormal conditions with which mechanical and electrical plant had to contend to meet the standard of reliability which the gas industry required and the exhausting conditions which the industry imposed. He was a leader in the struggle towards efficiency and reliability of operation—a leadership which led him to the post of deputy chief engineer of the Gas Light & Coke Company in 1935.

It was, however, during the great international upheaval of 1939—1945 that F. M. Birks rose to his greatest heights. He became chief engineer of the Gas Light & Coke Company at a time when the great works—Beckton, Bromley and others in the East End of London—were being heavily afflicted by enemy action and when guts and drive were necessary to maintain works in operation and to support the great morale which the workers and staff showed. F. M. Birks never failed to exhibit the characteristics of courage, fearlessness, determination and purpose which he expected from everybody working with him. It was due in no mean measure to his example that the enemy failed to inflict even deeper wounds on part of London's gas supplies.

During the war, as chief engineer to the Gas Light & Coke Company, he lived in a perpetual atmosphere of stretching resources to meet the public's requirements, and this no doubt set the stage for some of his most interesting post-war studies on the incidence and effect of peak-load on gas supply. Not everybody would agree nowadays with some of his preferred solutions to these problems but everybody will agree that he helped to pinpoint their magnitude and to set the stage for their solution.

Many will remember with affection his presidency of the Instituion of Gas Engineers: Somewhat shy and diffident in public appearance there was always a note of sincerity in what he had to say. Just as in his professional engineering career, he set a standard in Institution affairs not lightly forgotten.

He retired from the industry as deputy chairman of the North Thames Gas Board, and the memory of Falconer Moffat Birks will live in the Board, in the Institution and in the industry.

FORTHCOMING EVENTS

April 27. — NATIONAL BENZOLE AND ALLIED PRODUCTS ASSOCIATION: Granville House, 132-135, Sloane Street, London, S.W.1. Annual general meeting. 2.30 p.m.

April 28.—LONDON AND COUNTIES COKE SALES CIRCLE: Connaught Rooms, London. Brains trust on appliance testing. 2.30 p.m.

April 29.—SCOTTISH WESTERN JUNIORS: St. Enoch's Hotel, Glasgow. Annual general meeting.

April 29.—COKE OVEN MANAGERS' ASSOCIATION, SOUTHERN SECTION: Park Hotel, Park Place, Cardiff. 'Progress in Benzole Refining,' by T. Scott.

April 29.—MIDLAND SECTION, I.G.E.: Hotel Leofric, Coventry. Annual general meeting, preceded by luncheon at 12.45 p.m.

April 29. — LONDON AND SOUTHERN JUNIORS: Westminster Technical College, Vincent Square, London, S.W.1. 'A Comparison of Results Obtained in the Catalytic Gasification Plants in the Southern Gas Board,' by M. J. Birch and H. J. Lockwood. 6.30 p.m.

May 4.—INSTITUTION OF PLANT ENGINEERS: Polygon Hotel, Southampton. 'Insulation of Buildings,' by J. Churton. 7.30 p.m.

May 4-6.—INSTITUTION OF PLANT ENGINEERS: Grand Hotel, Scarborough. Annual Conference.

May 5.—EAST MIDLANDS G.C.C.: Nottingham Chamber of Commerce, Smithy Row, Nottingham. 11 a.m.

May 6.—NORTH OF ENGLAND SECTION I.G.E.: Keswick Hotel, Keswick. Annual general meeting and ladies' day. 11 a.m.

May 10.—INSTITUTION OF PLANT ENGINEERS: Engineers' Club, Albert Square, Manchester. 'The Application of New Materials to Plant Egineering,' by J. Leyland. 7.15 p.m.

May 11.—SOUTH WESTERN SECTION, I.G.E.: Visit to new technical college, Bath, followed by paper on technical education, by Alan H. Yates.

PERSONAL NOTES

MR. JOHN F. WILLSHER, General Works Manager of George Kent Ltd., has been appointed to the Board of Directors. Mr. Willsher joined the company in 1947. Four years later he was appointed production controller and, the following year, production manager. He held the post of instrument division manager from 1955 until early 1959, when he succeeded to his present post.

MR. V. W. PRESS has resigned as sales director of Lancashire Dynamo Nevelin Ltd. to take up a similar appointment with the Limit Engineering Group where he will be responsible for implementing the sales expansion programme following the acquisition of an additional factory at St. Albans. Mr. Press will operate from the group's main office at Islington.

MISS ELSIE M. SCORER, former secretary of the old Alnwick Gas Company, Northumberland, has retired after 44 years in the gas industry. Since nationalisation she has been employed in a secretarial capacity at the Alnwick unit of the Northern Gas Board.

MR. F. R. BROWN has been appointed Manager of the personnel, welfare and training division of the Press Group of Companies. Mr. Brown is well known in the cricketing world. During 1958-59 he was manager of the M.C.C. team touring Australia and New Zealand.

MR. G. L. HODGSON, who retired on March 31, after 27 years as manager of the Birmingham office of the Stanton Ironworks Co. Ltd., has been succeeded by MR. G. A. ATTER, previously deputy manager.

MR. J. RAMSAY has been appointed Assisant to MR. W. T. MATTOCK, Chairman and Managing Director of William Sugg & Co. Ltd. Mr. Ramsay has been for the past four years genera manager of Bratt Colbran Ltd.

MR. R. STARKEY has been appointed area Branch Manager of Perl Controls Ltd., covering the Midlands and North of England. His office is at 61, Broadfern Road, Knowle, Solihull, Warwickshire.

Long service

3,200 years' work

Mr. R. N. Bruce, Chairman of the South Eastern Gas Board, made his first presentation of long service awards to employees recently. Eighty employees —representing a total service of 3,200 years—had qualified during the last quarter of 1959. This brought the total of 40-year presentations to the Board's employees to 2,337 since nationalisation, said Mr. Bruce.

Among recipients was Mr. B. C. Hinwood, the Board's senior station engineer.